

The background of the cover is a photograph of three business professionals in a meeting. A man in a light blue shirt and striped tie is in the foreground, looking towards the right. Behind him, a woman with red hair and another man are also looking in the same direction. They appear to be in a modern office setting with large windows and a whiteboard in the background.

# Intermediate Management Accounting

SUMMARY NOTES

Think Ahead

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## MA2 Section 1

### Lesson 1: Management Information

#### What is management information?

**Management information** is information used by managers to help organisations achieve their goals. Management information can be financial or non-financial.

Managers use information for:

- Planning
- Control (how the organisation is performing in comparison with plans)
- Decision making

#### How do managers use information?

The process managers use to help them plan, control and make decisions is:

- Set objectives (planning)
- Identify the different ways the objectives could be achieved (planning)
- Gather information about the options (planning)
- Choose the options most likely to achieve the objectives (planning)
- Implement the options (decision making)
- Compare actual and predicted results (control)
- Take corrective action as necessary (control and decision making)

Accountants help managers to plan, control and make decisions by providing them with the right financial information and helping them to understand it.

#### Types and sources of information

**Management** information can be **financial** or **non-financial**.

Sources of information can be **internal** (e.g. accounting records, records about employees) or **external** (e.g. documentation from suppliers).

Useful management information is **ACCURATE**:

- Accurate
- Complete
- Cost-beneficial
- User-targeted
- Relevant
- Authoritative
- Timely
- Easy to use

## Recording management information

Management information is used to create financial accounts and management accounts.

	Financial accounts	Management accounts
Users	Not involved in the running of the organisation	Run the organisation
Historical versus future actions	Reflect what has happened in the past	Use past information to help decision making about the future
Legal versus optional	Legal requirement	Prepared if, how and when an organisation chooses
Coverage	All financial activities of the whole organisation	Can be tailored to business needs

## Using information technology (IT) in accounting

Data is information in raw or unorganised form.

Computers are widely used by accountants to input data, analyse it and to generate reports.

**Management Information Systems (MIS)** are computer systems designed to give managers the information they need to make effective decisions.

Tools and technologies include:

- For data input – typed entries, barcode readers, smart cards, mobile devices
- For data storage and processing – servers, portable data storage
- Data output (can be received on any device) – reports

## Trainee accountants and the management accounting process

In general, the trainee accountant will be tasked with collecting and processing the data that helps a manager to make decisions.

## Lesson 2: Introduction to costs

### An overview of costs

A **cost** is the amount that you have to pay to buy or make something.

**Costing** or **cost accounting** is a way of understanding the true costs of an item.

A **cost unit** is a unit of product or service which has costs associated with it.

Costs can be categorised by:

- Type (for example, materials, labour or expenses)
- Traceability (direct or indirect)
- Behaviour (fixed, variable, semi-variable).
- Function (for example, production and non-production)
- Responsibility (in other words, costs can be categorised by the manager responsible for all the costs in their responsibility centre)

A **responsibility centre** is department or function whose performance is the direct responsibility of a specific manager. There are four types of responsibility centre:

- Cost centres
- Revenue centres
- Profit centres
- Investment centres

### Direct and indirect costs

**Direct costs** are costs that can be traced in full to cost units.

**Indirect costs** are costs that cannot be traced directly to a unit of product or service. They are necessary for the organisation to produce goods or services in general, but cannot be identified with any particular item of good or service. Examples include:

- Indirect labour such as supervisors
- Indirect expenses such as petrol for a delivery van
- Indirect materials such as cleaning materials

Direct costs are also known as **prime costs**. Indirect costs are also known as **overheads**.

### Creating a cost card

A **cost card** lists all direct and indirect costs and can be used to calculate an accurate cost per cost unit.

Management accounting information is only used internally, so methods that are not in line with the accounting standards can be used (e.g. LIFO or average cost can be used as a method of inventory valuation).

A cost code is used to help simplify the input of data into the accounting system and to help classify it correctly in the accounting system.

**Documentation**

A **source document** is a record containing the details to prove a business transaction. Examples include supplier invoices and bank statements.

**Bookkeeping** is the recording of financial transactions.

**Interlocking systems** keep the financial and management (cost) accounting separate, but are periodically reconciled to each other.

**Integrated systems** keep the cost and financial accounts in the same set of records.

### Lesson 3: Cost behaviour

#### Different cost behaviours

A **fixed cost** remains the same irrespective of the level of output.

A **variable cost** increases in direct proportion to the level of output.

A **semi-variable (mixed) cost** has both fixed and variable components.

A **stepped cost** is fixed within certain output levels.

Different cost behaviours have different effects on the cost per unit:

- The cost per unit for fixed costs will decrease as more units are produced.
- The cost per unit for variable costs will stay the same as more units are produced.
- Semi-variable costs have both fixed and variable elements, so the cost per unit will decrease as more units are produced.

#### The high-low method

The **high-low method** can be used to separate the elements of semi-variable costs and predict how they will behave at different activity levels.

**Step 1** Select the highest and lowest activity levels.

**Step 2** Note these activity levels and the costs at these activity levels.

**Step 3** Calculate the variable cost per unit =

$$\text{Variable cost} = \frac{(\text{total cost at highest level of activity} - \text{total cost at lowest level of activity})}{(\text{total units at highest level of activity} - \text{total units at lowest level of activity})}$$

**Step 4** Calculate the fixed cost, using the total costs formula:

$$\text{Total costs at a level of activity} = \text{fixed costs} + (\text{total units at that level of activity} \times \text{variable cost per unit})$$

**Step 5** Calculate the total costs at the target level of activity, using the total costs formula.

## Lesson 4: Budgets and variances

### Budgets and forecasts

**Budgets** are financial plans for the future, showing income and costs for a particular period.

Budgeting relies on the **principal budget factor**. This is the element that limits the activities of the organisation. Normally this is the level of sales because customer demand and ability to pay for the goods will be finite, but it might also be the availability of labour or raw materials.

Whereas a budget is a financial plan for the future, a **forecast** is a prediction of the future. A budget is what the business wants, whereas a forecast is what a business expects. It is normally prepared in the financial year, whereas the budget is normally prepared before the start of the financial year.

### Comparisons

Managers compare sets of information in order to put that information into context. Comparisons can highlight mistakes and problems.

Comparisons can be made between actual results and:

- Budgets
- Forecasts
- Corresponding periods
- Previous periods

A **variance** is the difference between budgeted data and actual data.

- **Favourable variances** mean the organisation has more money (financially beneficial).
- **Adverse variances** mean the organisation has less money (financially damaging).

### Flexing the budget

When actual activity levels are different to budgeted activity levels the budget needs to be adjusted. This is known as **flexing the budget**.

The initial, unflexed budget is sometimes called the '**fixed budget**'. Comparing actual performance with the fixed budget is not meaningful because it does not take into account the actual volume of output produced.

To produce a flexed budget for comparison with actual performance:

**Step 1** Recalculate the budget based on the actual level of activity for all variable costs. Fixed costs do not change. This produces the flexed budget.

**Step 2** Compare the flexed budget with the actual costs and calculate the variances

Reflecting the actual activity levels in the (flexed) budget can produce a more realistic basis from which managers can judge actual performance.



## Variances

Total variances shown on a flexed budget can be split into two sub-variances.

- **Activity/volume variance:** the difference between the original budgeted direct cost and the flexed direct cost budget. This variance shows us the effect of the actual activity level being different from the budgeted activity level
- **Price/efficiency of usage variance:** the difference between the flexed direct cost budget and the actual direct cost incurred. This variance shows us the effect of costs or efficiency per unit being different from budget.

Cost variances:

Cost for actual activity level should have been	\$X
But was	<u>\$X</u>
Total direct cost variance	<u>\$X</u> (Adv/Fav)

Budgeted production volume	X units
Actual production volume	<u>X units</u>
Activity variance in units	X units
× Budgeted cost per unit	<u>× \$X</u>
Activity/ volume variance	<u>\$X</u> (Adv/Fav)

Actual production should have cost	\$X
But did cost	<u>\$X</u>
Price/efficiency variance	<u>\$X</u> (Adv/Fav)

The total direct cost variance is the total effect of all of the following:

- Difference between actual production volume and budgeted production volume
- Difference between actual cost price and budgeted cost price
- Difference between actual efficiency usage and budgeted efficiency usage

Total direct cost variance = activity variance + purchase price/efficiency of usage variance

Sales variances:

Sales revenue should have been	\$X
But was	<u>\$X</u>
Total sales revenue variance	<u>\$X</u> (Adv/Fav)

Budgeted sales volume	X units
Actual sales volume	<u>X units</u>
Activity variance in units	X units
× Budgeted selling per unit	<u>× \$X</u>
Activity variance	<u>\$X</u> (Adv/Fav)

Sales revenue for actual prod'n should have been	\$X
But was	<u>\$X</u>
Selling price variance	<u>\$X</u> (Adv/Fav)

Total sales revenue variance = activity variance + selling price variance

### Reporting variances

**Exception reporting** is a way of ensuring that managers just get the information they need by only reporting the variances that are significant.

**Controllable variances** can be corrected by the manager, but **non-controllable variances** are caused by factors beyond the manager's control. Managers may have to explain non-controllable variances and may have to adjust their plans accordingly.

Variances should be investigated when:

- The variance is significant (exceeds the threshold %).
- The variance is controllable.
- The investigation of the variance is cost-beneficial.

### Reasons for variances

Examples include:

- |   |                              |
|---|------------------------------|
| ▪ Labour rate/efficiency of usage (adverse)       | Market rate increase         |
| ▪ Labour rate/efficiency of usage (favourable)    | Better quality material used |
| ▪ Material price/efficiency of usage (adverse)    | Poor quality material used   |
| ▪ Material price/efficiency of usage (favourable) | Unexpected discount received |

## Planning and control cycle



Managers use two types of control system within the planning and control cycle:

**Feedback control:** Managers compare actual results with suitable control data, analyse the variances and take action to bring future results into line with the plan. Feedback action takes place **after** something has gone wrong and a variance has already occurred. Most budgetary systems provide **feedback**.

**Feedforward control:** This type of control helps to prevent future problems. An example of feedforward control is comparing budget to forecast and resolving issues that will happen in the future and affect future performance.

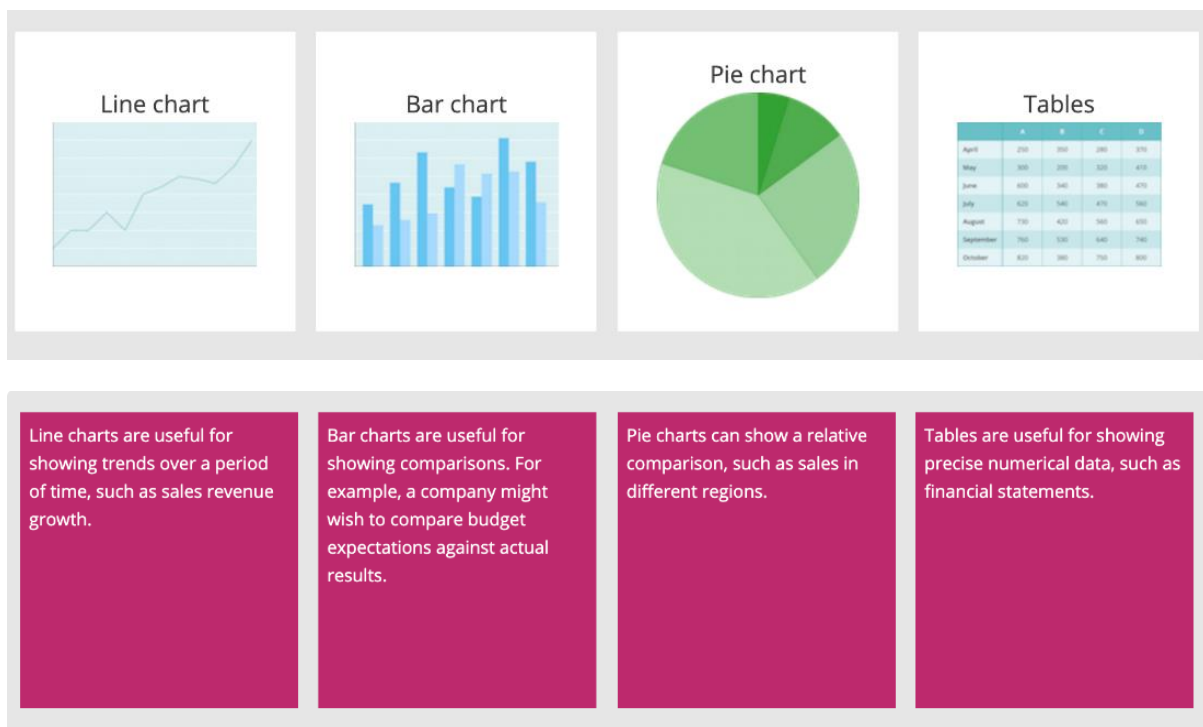
## Lesson 5: Reporting

### Analysing and presenting data

**Data analysis** turns raw data into useful information that can be used by managers for decision-making. Analysis involves:

- Organising the data
- Identifying, removing and/or correcting incomplete, duplicated or inaccurate data
- Using statistical analysis to understand the data and to identify relationships within the data

Once the data has been analysed and 'cleaned', it can be presented and communicated to the person(s) who will be using it in a way that they will find easy to understand. Charts, graphs and tables are useful ways of presenting data because they quickly highlight relationships and trends within data.



### Communicating information

There are many different options for communicating information to managers and others requiring information in an organisation, including:

- Visual – for example videos/podcasts, signs
- Written – for example formal reports, internet/intranet, emails
- Oral – for example telephone calls, face-to-face meetings

The recipient of the information (for example their seniority) and the relationship between sender and recipient (formal or informal) will affect the method of communication.

Electronic methods of communication are increasingly chosen because they are fast, cheap and can reach many recipients at once. However, they are not always appropriate for confidential information, and sometimes physical evidence of communication is required, such as a paper invoice or a bank statement.

## Reports

Reports are a common method of presenting information in management accounting. Reports may be standard (produced regularly) or ad hoc (produced to respond to a single situation or problem that has occurred).

## Lesson 6: Materials

### Classifying materials

**Direct materials** are materials that clearly relate to a production unit. Raw materials are direct materials.

**Indirect materials** do not clearly relate to a single unit of production.

All the raw materials, work in progress (part-finished products) and unsold finished products held by an organisation are known as the **inventory**.

Organisations usually keep a store of raw materials and part-finished/finished products because of:

- The time lag between ordering and delivery of goods, so a buffer stock is held
- Bulk purchase discounts
- Seasonal demand

### Material input and wastage

The material input requirement for a product = wastage + output

Some wastage is avoidable e.g. if workers make mistakes or low-quality materials are purchased.

Wastage can be measured by:

- Monitoring actual input wastage (material wasted in producing a product)
- Monitoring output wastage (items rejected as they are not up to standard)
- Monitoring rework (number of items requiring corrections)

Avoidable wastage can be reduced by:

- Training to ensure that workers are operating correctly and efficiently
- Reviewing the quality of the materials being purchased
- Replacing old equipment

### Inventory valuation

First in, first out (FIFO)

- The first items purchased are the first ones used.
- The remaining inventory is valued at the price of the most recent purchases

Last in, first out (LIFO)

- The last items purchased are the first ones used.
- The remaining inventory will be valued at the price of the oldest purchases.

Cumulative weighted average pricing

- A new average cost is calculated each time a new delivery is received, and any subsequent issues to production are valued at this price.

### Periodic weighted average pricing

- A new inventory unit value is calculated at the end of a given period using the formula:

$$\text{Average issue price} = \frac{\text{Cost of all receipts of inventory in the period} + \text{cost of opening inventory}}{\text{Number of units received in the period} + \text{number of units of opening inventory}}$$

The value placed on inventory is important because the closing inventory is used to calculate the cost of sales (CoS), which affects profit. CoS is sometimes called the cost of goods sold.

$$\text{CoS} = \text{value of opening inventories} + \text{cost of goods produced in the period} - \text{the value of closing inventories}$$

In the financial accounts, IAS 2 Inventories requires organisations to use the FIFO valuation method. However, for internal, management accounting purposes, whichever method will be most useful for decision-making can be used.

Each of the different valuation methods has advantages and disadvantages.

In periods of inflation:

- The cost of goods sold is valued lower under FIFO than it is under LIFO or weighted average pricing, so profit is shown as being higher.
- The cost of goods sold is valued higher under LIFO than under FIFO or weighted average pricing, so profit is shown as being lower. In periods of high inflation it can provide managers with a more realistic idea of the cost of goods sold.
- Weighted average methods will produce a cost of goods sold value that is in between LIFO and FIFO. It is easier to administer and easier for managers to use and understand.

### Inventory costs and control

There are four main categories of inventory costs:

- Purchase costs (the inventory value)
- Ordering costs (administration and transport costs)
- Holding costs (storage, interest charges, insurance, obsolescence, deterioration)
- The costs of a stockout (loss of sales during stockout period, loss of reputation, cost of production stoppages, extra ordering costs for urgent orders)

**Obsolescence:** When materials are no longer required for a business or organisation, they must be discarded and their cost written off.

**Deterioration:** If materials are kept in store for a long time, they may deteriorate and become unusable. When they are disposed of, the value must be written off.

Managing the different inventory costs is a balancing act, as all the costs are dependent on each other.

- Higher holding costs from large amounts of inventory versus lower ordering costs and purchase costs from ordering in large amounts
- Higher holding costs versus the cost of a stockout

Maintaining an optimum inventory level minimises costs. Four inventory control levels that help to ensure an optimum level of inventory are:

$$\text{Reorder level} = \text{maximum usage} \times \text{maximum lead time}$$

$$\text{Minimum level} = \text{reorder level} - (\text{average usage} \times \text{average lead time})$$

$$\text{Maximum level} = \text{reorder level} + \text{reorder quantity} - (\text{minimum usage} \times \text{minimum lead time})$$

$$\text{Average inventory} = \text{minimum inventory} + \frac{1}{2} \text{ reorder quantity}$$

### Economic order quantity (EOQ)

Assumptions:

- The holding cost per unit is constant
- Average inventory held =  $0.5 \times \text{reorder quantity}$

$$\text{EOQ} = \sqrt{\frac{2C_0D}{C_H}}$$

where:

- $C_H$  = cost of holding one unit of inventory for one time period
- $C_0$  = cost of ordering a consignment from a supplier
- $D$  = demand during the time period

### Inventory checking

There are two methods of stocktaking:

- **Periodic:** Materials in the inventory are counted once a year.
- **Continuous:** Materials are checked regularly throughout the year (which can be less disruptive for organisations and more accurate).

Inventory checks may reveal **discrepancies** between how much of an item there really is in inventory and the amount shown in the inventory records.



## MA2 Section 2

### Lesson 1: Labour

#### Labour

**Direct labour** is the labour that relates to a particular product or service, such as the hairdresser who cuts your hair.

**Indirect labour** is the labour that does not relate to a particular product or service, such as the factory manager or the receptionist in the office.

In the exam, you should treat labour costs as a variable cost, unless you are told otherwise.

**Remuneration** is what employees receive in exchange for work.

The different methods of determining payment for employees can be grouped into two main categories:

- Time-based (**salary, wages** and **overtime**)
- Output- or performance-based (**incentive schemes** that are designed to encourage employees to work harder or more efficiently)

Incentive schemes include:

- Piecework
- Bonuses
- Commission
- Profit-sharing schemes

#### Payroll systems

Payroll systems link with:

- HR systems
- Financial accounting systems
- Management information systems (generate reports for cost control and future planning)

Accounting for labour costs

- 1     **Payment of labour**  
       Dr Labour control  
       Cr Bank
  
- 2     **Charging of direct labour**  
       Dr WIP  
       Cr Labour control
  
- 3     **Charging of indirect labour**  
       Dr Production overhead control  
       Cr Labour control

## Labour turnover

The costs of labour turnover can be put into two categories:

- **Preventative costs:** the costs involved in encouraging employees to continue working at the organisation e.g. cost of benefits and incentive schemes
- **Replacement costs:** the costs involved in recruiting and hiring new employees e.g. cost of training new staff

Organisations measure labour turnover and try to keep it as low as possible to minimise the replacement costs involved.

$$\text{Labour turnover rate} = \frac{\text{Replacements}}{\text{Average number of employees in period}} \times 100\%$$

## Labour efficiency and utilisation

An organisation's production is seen as **efficient** if it produces as many, or more, products than expected within a certain period.

There are three ratios for measuring labour performance:

The **efficiency ratio** measures whether the production output for a period took more or less direct labour time than expected.

$$\text{Efficiency ratio} = \frac{\text{Expected hours to make actual output}}{\text{Actual hours taken}} \times 100\%$$

The **capacity utilisation ratio** measures whether the total direct labour hours worked were greater or less than budgeted.

$$\text{Capacity utilisation ratio} = \frac{\text{Actual hours worked}}{\text{Hours budgeted}} \times 100\%$$

The **production volume ratio** measures how the actual production output for a period (in direct labour hours) compares with the budgeted output.

$$\text{Production volume ratio} = \frac{\text{Expected hours to make actual output}}{\text{Hours budgeted}} \times 100\%$$

The relationship between the three ratios is:

$$\text{Efficiency ratio} \times \text{capacity utilisation ratio} = \text{production volume ratio}$$

The **idle time ratio** shows the proportion of available hours which were lost as a result of idle time.

$$\text{Idle time ratio} = \frac{\text{Idle hours}}{\text{Total hours}} \times 100\%$$

## Lesson 2: Other expenses

### Classifying and recording expenses

Other expenses – referred to as expenses – are costs that are not materials or labour costs.

Expenses can be classified by function e.g. production department expenses include repairs, maintenance and lease costs.

**Direct expenses** are incurred on a specific product and are part of the direct (or prime) cost of the product e.g. employer's pension contributions for direct labour.

**Indirect expenses** cannot be attributed to a specific product and are also known as overheads e.g. warehouse insurance.

### Capital and revenue expenditure

Capital expenditure is often abbreviated to **CAPEX**.

- CAPEX takes place when a new non-current asset is bought or existing non-current assets are improved or it may relate to the replacement of a non-current asset that has come to the end of its useful life.
- An example of capital expenditure is a company buying a new truck, or modifying an existing truck so that it can carry heavier loads.
- CAPEX is shown on the statement of financial position.

Revenue expenditure is also called **operating expenditure**.

- It takes place when paying for the ongoing costs of running the organisation.
- Examples of revenue expenditure include buying raw materials, paying for labour and paying rent. Revenue expenditure is shown on the statement of profit or loss.

Revenue items immediately reduce profit. Capital expenditure does not affect the calculation of profit.

### Depreciation

Depreciation is a way to match expenditure on non-current assets to the time period when the assets are used. It is a revenue expense and is shown on the statement of profit or loss.

- **Depreciation** – the yearly share of the total cost of ownership of an asset
- **Useful life** – the length of time the asset will be of benefit to the organisation
- **Residual value** – the remaining value of the asset after its useful life has ended
- **Carrying value or net book value** – cost minus all depreciation charged to date

### Straight line method

- Charge equal amounts each year
- Annual depreciation charge =  $(\text{cost} - \text{residual value}) \div \text{useful life}$

### Reducing balance method

- Charge most in the first year, and then less and less as the asset gets older
- Annual depreciation expense = net book value at the start of the period × depreciation rate %

### Machine hours method

- Charge according to how much the asset is used in each year
- Annual depreciation charge = ((cost – residual value) × actual usage) ÷ estimated total usage

### Product units method

- Charge according to how many units of product will be made using the asset.
- Annual depreciation charge = ((cost of non-current asset – residual value) × actual production) ÷ estimated total production

In the product units or machine hours methods, the depreciation charged each year will be according to the actual levels of production or machine hours used. If production levels or machine hours are higher than expected, the asset will therefore be fully depreciated earlier than planned. Depreciation stops when the net book value is equal to the residual of the asset.

### Lesson 3: Job and batch costing

#### Job costing

In the context of accounting, a **job** is a cost unit that is made up of one order or contract.

For example, a building company may have a contract to construct an office building for their client. The office building will be a unique product, specific to that customer. It will have a unique cost, according to the materials, labour and other expenses involved in creating the product. This is a job.

#### How job costing works

**Step 1** All the expected material and labour costs, in addition to other estimated direct expenses and overheads, are collected on a job cost card.

**Step 2** The job cost card is used to inform a budget for the job.

**Step 3** The actual costs for the job are recorded in a job account.

Job account			
	\$		\$
Direct materials	X	Finished jobs	X
Direct labour	X		
Direct expenses	X		
Production overhead at budgeted rate	X		
Other overheads	X		
Total cost	<u>X</u>		<u>X</u>

#### Cost plus pricing

**Cost plus pricing** is a pricing method where the required profit is added to the total cost of the product.

There are two main ways to calculate profit:

- Profit mark-up
- Profit margin

Both of these use percentages:

- Mark-up is the percentage of the cost that you add on to get the selling price
- Margin is the percentage of the *selling price* that is profit.

To calculate the profit and selling price using mark-up:

$$\text{Total cost} \times \text{mark-up\%} = \text{profit}$$

$$\text{Selling price} = \text{total cost} + \text{profit}$$

To calculate the selling price and profit using margin:

Total cost / (1 – margin%) = selling price

Selling price – total cost = profit

### Batch costing

A is a specific quantity of standard units. The units that are made in each batch will all be the same.

Cost per unit = total batch cost/number of units in batch

The equipment used for batches often needs to be cleaned and set up for the next batch to be processed through it. Set-up costs are recorded as a direct expense.

### Cost control

Managers regularly monitor the costs incurred by an organisation and take actions to try to ensure that the organisation is not spending more money than it needs to or wasting money through inefficient use of materials or labour. This is known as **cost control**.

Cost control strategies include:

- Planning
- Ordering economically
- Buying materials of the right quality
- Training and supervising workers appropriately
- Appropriate authorisation of invoices

Issues in controlling job costs include:

- Ordering too many materials, or materials of a higher quality than necessary
- Difficulty in estimating the time needed to complete the job – paying workers overtime or hiring more workers will add to the cost
- Requirement for special equipment and expertise
- Additional administration and management costs

Accountants should prepare variance statements on a regular basis, perhaps weekly, to make sure that managers can identify overspends and take action as quickly as possible to control them.

Cost control is easier if an organisation is producing goods in batches, as each batch of the same product will have the same requirements. Controlling the set-up costs is the key to controlling batch costs.

Regular maintenance and upkeep may make the clean-up between batches faster.

Making batches of an optimum size, rather than numerous small batches, will reduce set-up costs.

## Lesson 4: Service costing

### Services

Services usually demonstrate five key characteristics:

- **Intangibility:** services are not physical.
- **Perishability:** services cannot be stored for future use.
- **Inseparability:** the service provider cannot be separated from the service.
- **Inconsistency:** each instance of the service is unique.
- **Involvement:** the customer is involved in the service delivery.

Examples of service providers include accountancy firms (providing audit services) and universities (providing an education).

Services are also provided within organisations (internal services) by service departments/cost centres, for example maintenance and canteens.

Problems in service costing include:

- The service is intangible so it can be hard to decide on a cost unit that can be measured.
- Indirect costs are often a larger percentage of the cost of a service than of a physical product. The problem of sharing costs between cost units on a fair basis therefore needs to be solved.
- The amount of time and materials spent on each cost unit might be different each time.

### Service cost units

**Composite cost units**, which combines two or more elements of the service, are often used. Examples include:

- For a hospital – bed-day (cost of providing care to a patient in a bed per day)
- For a school – per student per year or per student per course
- For a bus service – per passenger per kilometre

$$\text{Cost per service unit} = \frac{\text{Total costs for period}}{\text{Number of service units in the period}} \times 100\%$$

Not-for-profit organisations do not set a price for their services, but they will often calculate a cost per unit for the following reasons:

- To demonstrate their efficiency
- To help measure performance and improvements over time
- To help control costs.

However, unit costs ignore quality.

## MA2 Section 3

### Lesson 1: Absorption costing 1

#### What is absorption costing and why is it necessary?

Absorption costing is a way of including overheads (indirect costs of producing a product or service) in the total cost per unit of a product or service in order to:

- Calculate a selling price
- Work out if a product is profitable
- Accurately value inventory and calculate an accurate cost of sales figure

#### Allocation

**Allocation** involves assigning overhead costs incurred by only one production cost centre (for example the assembly centre) or service cost centre supporting production (for example the maintenance centre) to that particular cost centre.

#### Apportionment: stage 1

Some costs are common costs: they relate to items that are used by more than one cost centre (e.g. rent, insurance, water and electricity).

Common costs are shared cross the production and service cost centres on a fair basis.

Basis	Possible costs
Floor area	Rent, cleaning, utilities, building maintenance
Number of employees	Canteen, health and safety, parking costs, training
Volume	Heating

For example, suppose a company's rent is \$5,000 and heating is \$3,000 and information about the cost centres of the company is as follows.

The overhead is apportioned as follows.

#### Apportionment: stage 2

The costs allocated and apportioned to service cost centres are then divided between production cost centres only.

There are two methods of reapportionment:

- **Direct method of reapportionment.** The service cost centre costs are reapportioned to the production cost centres only. The order in which service cost centres are reapportioned does not matter.
- **Step-down method.** The costs of one service centre (CS1) are reapportioned to the production cost centres and the other service centre (CS2). The costs of the other service centre (CS2) are then reapportioned to the production cost centres. In the exam, read the question carefully in case it tells you which cost centre to use first. If it doesn't tell you, then reapportion the largest service centre costs first.



With both methods, all overhead costs are ultimately charged to production departments. However, the amount allocated to each production department will be different depending on the method used.

## Lesson 2: Absorption costing 2

### Overhead absorption rate (OAR) and cost drivers

The OAR is the rate at which total production overhead costs are added to the cost per unit of each product.

- OAR based on machine hours =  $\text{total overheads for the cost centre} / \text{total machine hours}$
- OAR based on direct labour hours =  $\text{total overheads for the cost centre} / \text{total direct labour hours}$

### Predetermined OAR

In practice a **predetermined overhead absorption rate** is used based on budgeted figures for overhead costs and activity (as waiting until the end of the year when actual overhead figures are known to determine the full cost of a product is too late for decision-making purposes). Overheads are then charged to products on the basis of actual labour hours or machines hours used to produce the products.

Predetermined OAR (e.g. based on direct labour hours) =  $\text{total budgeted overheads} \div \text{total budgeted direct labour hours}$

### Over and under absorption

If overhead absorption rates are based on budgeted overheads, the actual overheads might not be the same as the budgeted figures. This could result in either:

- **Over absorption:** actual overheads are less than absorbed overheads
- **Under absorption:** actual overheads are greater than absorbed overheads

### Summary of absorption costing

**Step 1** Identify production and production service cost centres

**Step 2** Identify overheads

**Step 3** Allocate whole overhead costs (budgeted) to cost centres

**Step 4** Apportion shared (common) overhead costs between cost centres and then reapportion production service cost centre costs to production cost centres

**Step 5** Identify cost drivers (for example, labour hours or machine hours) to calculate the OAR for each production cost centre

**Step 6** Calculate a predetermined OAR

**Step 7** Determine over or under absorption

### Non-production overheads

If an organisation wants to show non-production overheads within the total cost per unit, they are dealt with in the same way as production overheads. Costs are absorbed and charged as a percentage of production cost or sales value.

$$\text{Overhead absorption rate} = \frac{\text{Estimated non – production overheads}}{\text{Estimated production costs}}$$

For example, suppose the estimated non-production overheads are \$10,000, estimated production costs are \$200,000 and the production cost per unit is \$100. The OAR is  $\$10,000/\$200,000 = 5\%$  and the non-production overhead absorbed per unit is  $\$100 \times 5\% = \$5$ .

### Absorption costing for services

The process of absorption costing for services is the same in principle as for products. The cost driver for absorption is more likely to be labour for a service, but you should consider the activities being undertaken in order to select the most appropriate driver.

### Lesson 3: Marginal costing

#### Marginal cost

**Marginal cost** is the cost of making one more unit of a product; in other words, it is the cost that would be avoided if a unit of a product were not produced.

When there is spare capacity in the production process, the marginal production cost is made up of:

- **Direct materials** (this is a **variable** cost as the amount of materials used will increase or decrease in proportion to the number of units produced)
- **Direct labour** (if this is a **variable cost**: you should always treat direct labour as a variable cost unless you are told otherwise)
- **Variable production overheads**

Inventory is valued at its marginal cost when marginal costing is used and fixed costs are treated as an expense that belongs to the period of time. They are not carried forward to the next period.

#### Contribution

Contribution per unit = selling price per unit – marginal cost per unit

Total contribution = contribution per unit × sales volume

where 'contribution' means 'contribution towards covering fixed costs and making a profit'.

If total contribution is less than total fixed costs, there is a loss.

If total contribution is greater than total fixed costs, there is a profit.

#### Marginal costing versus absorption costing

Where production volume is equal to sales volume, the profit figure under marginal costing will be the same as under absorption costing.

The two profits can be reconciled as follows:

#### Marginal costing profit

+ increase in inventory units in period × fixed production overhead absorption rate

Or

– decrease in inventory units in period × fixed production overhead absorption rate

#### Absorption costing profit

Marginal costing provides better information for short-term planning and decision-making.

Absorption costing provides better profit information for managers because it includes the full costs. Absorption costing **must** be used for financial accounts.

## Lesson 4: Process costing 1

### Losses and gains

**Process costing** is a method of keeping records of costs incurred when the output (product) is continuously produced through one or more processes.

**Normal loss** is the expected wastage from a process. It is not given a cost.

**Abnormal loss** occurs when a loss is higher than the normal expected loss. Abnormal loss is given a cost.

**Abnormal gain** is actual loss that is lower than the normal expected loss. Abnormal gain is a reduction in total process costs, as if it were a discount on materials purchased.

Cost per unit = (cost of inputs – scrap value of normal loss)/expected output in units

### Completing a process account

**Step 1** Draw up a T account for the process account and fill in the information you have.

Process account					
	Units	\$		Units	\$
Materials	X	X	Normal loss	X	X
Labour		X	Abnormal loss	X	X
Overheads		X	Output	X	X
Abnormal gain					

The units column helps us to understand what is happening in the account, but it is not actually part of the double-entry system.

**Step 2** Calculate the normal loss in units.

If there is scrap value, enter the value of scrap in the \$ column, otherwise the value of the normal loss is nil.

**Step 3** Calculate the abnormal gain or loss in units.

**Step 4** Calculate output and total costs.

**Step 5** Calculate the value of abnormal loss.

This is costed at the cost per unit of actual output ('good' output).

**Step 6** Write off abnormal loss.

Abnormal loss					
	Units	\$		Units	\$
Process account	X	X	Statement of profit of loss	X	X

**Step 7** Recognise abnormal gain.

Abnormal gain					
Scrap account	X	X	Process account	X	X
Statement of profit or loss		X			

Note that there will not always be an abnormal loss or an abnormal gain, and both cannot occur at the same time.

### Scrap value

Revenue from scrap reduces costs. When scrap is sold the revenue is normally used to offset the cost of production, rather than being shown as income.

- Normal loss: affects the expected cost per unit
- Abnormal loss: an additional cost written off to the statement of profit or loss
- Abnormal gain: a reduction in cost posted to the statement of profit or loss

## Lesson 5: Process costing 2

### Joint and by-products

**Joint and by-products** are two or more products that come from a common process that are not separately identifiable until after a **split-off point** or **separation point**. Costs incurred before the split-off point are **common costs**.

- By-products have an insignificant sales value to a particular organisation.
- Joint products have a considerable sales value to an organisation.

Common process costs can be apportioned to joint products using:

- Physical measurement of output (quantity, weight or output)  
Cost per unit of output = total pre-separation costs ÷ total output
- Market value of output  
Cost per \$ of sales = total pre-separation costs ÷ total sales value

If a product cannot be sold at split-off point and **requires further processing**, common costs can be apportioned using:

- Market value of output with further processing  
Cost per \$ of sales = total pre-separation costs ÷ net realisable value

If a product can be sold at split-off point (let's call it product X) or could be processed further and then sold (let's call it product XX), it is worth further processing if the incremental revenue from product XX (sales revenue less further processing costs) is greater than the sales revenue from product X.

By-products are not given a share of the common costs. Instead, the net realisable value of the by-product (sales revenue less post-split-off point processing costs) reduces the cost of production of the main product or, if the value is very small, by-product receipts can be transferred to income as incidental other income.

## MA2 Section 4

### Lesson 1: Cost-volume-profit (CVP) analysis 1

#### CVP analysis

Cost-volume-profit (CVP) analysis is a technique used to analyse how costs and profit are affected by the volume of production and sales.

#### Break-even point

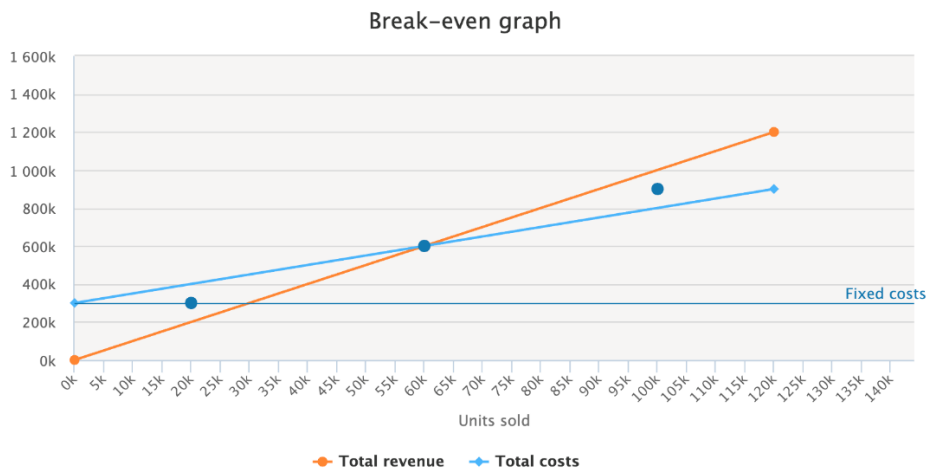
The **break-even point (BEP)** is the level of activity at which the organisation is covering all its costs, but not making a profit. In other words, it is the level at which there is neither profit nor loss.

It can be calculated in three ways:

- 1 Using the break-even equation:  

$$\text{Profit} = (\text{SP} \times \text{Q}) - (\text{VC} \times \text{Q}) - \text{FC}$$
 At the BEP, profit = 0 and hence:  

$$\text{BEP (Q)} \text{ is when } 0 = \text{SP} \times \text{Q} - \text{VC} \times \text{Q} - \text{FC}$$
- 2 Using a break-even graph  
 The BEP is the point at which the total cost and total revenue lines cross.



If fixed cost increase, the total costs line gets steeper and the break-even point increases.

If the selling price increases, the revenue line gets steeper and the break-even point increases.

- 3 Using contribution  

$$\text{BEP} = \text{fixed costs} / \text{contribution per unit}$$
 Contribution per unit is also known as the unit contribution margin (UCM).



**Contribution to sales (C/S) ratio**

The **contribution to sales ratio** (also known as the **profit to volume (P/V) ratio**) tells us how much each \$1 of sales revenue contributes towards fixed costs and then, once fixed costs are covered, the contribution towards profit.

$$\text{C/S ratio} = \frac{\text{contribution per unit}}{\text{sales price per unit}}$$

$$\text{C/S ratio} = \frac{\text{total contribution}}{\text{total revenue}}$$

The C/S ratio is expressed as a percentage or a decimal.

The C/S ratio can be used to calculate the break-even point in sales revenue.

$$\frac{\text{Fixed costs}}{\text{C/S ratio}} = \text{sales revenue at BEP}$$

$$\frac{\text{Sales revenue at BEP}}{\text{selling price}} = \text{sales volume at BEP}$$

**Margin of safety**

Margin of safety = planned revenue – break-even revenue

The **margin of safety** can be shown as:

- The number of units
- The \$ sales revenue
- A percentage of planned sales

It can be shown on a **break-even chart**.

Because the margin of safety tells us the extent to which sales can fall before a business makes a loss, it gives us an idea of how risky a business is.

## Lesson 2: Cost-volume-profit (CVP) analysis 2

Questions involving target profit, sales volume and selling price can be answered using:

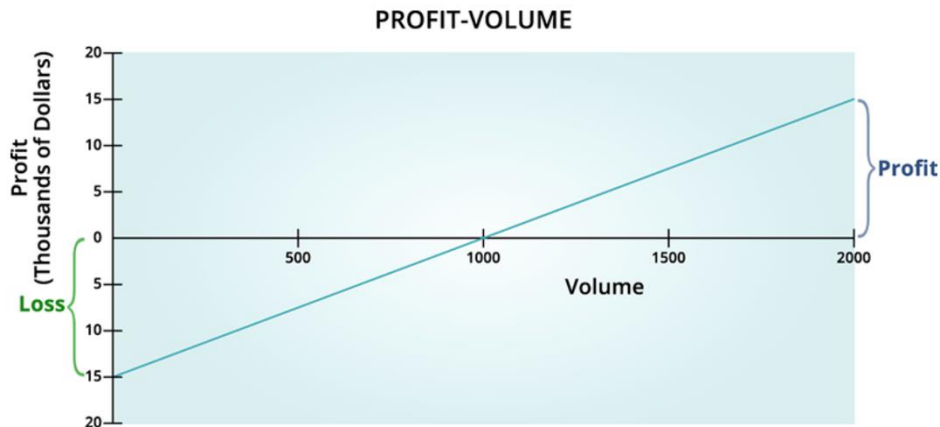
$$\frac{\text{Fixed costs}}{\text{C/S ratio}} = \text{sales revenue at BEP}$$

$$\frac{\text{Sales revenue at BEP}}{\text{selling price}} = \text{sales volume at BEP}$$

$$\text{Selling price} = \left( \frac{\text{fixed costs}}{\text{sales volume}} \right) + \text{variable costs}$$

### Profit/volume (P/V) graphs

P/V graphs illustrate the relationship between profit and sales volume.



- The loss when volume is zero is the fixed cost – this is the intersection of the line on the Y axis.
- The line crosses the X axis at the breakeven point.
- The gradient of the line is the contribution per unit.
- If the contribution per unit increases, the line will get steeper and the breakeven point will be lower.
- If the contribution per unit decreases, the line will get shallower and the breakeven point will be higher.
- If fixed costs change, the line will start at a higher or lower point on the Y axis, but will run parallel to the original line.

### Lesson 3: Short-term decision making

#### Limiting factors

A **limiting factor** is a factor that restricts an organisation's activities. The most common limiting factor for a business is sales demand.

If there is a shortage of any resource required to make a product or deliver a service, it will limit the quantity of product or service that can be made/delivered. We call these scarce resources or limiting factors.

To identify a limiting factor and determine an optimal production plan:

**Step 1** Identify the limiting factor by comparing the amount of each resource needed to make all units demanded with the resource available.

**Step 2** Calculate contribution per unit for output for each product.

**Step 3** Calculate contribution per unit of limiting factor for each product.

Contribution per unit of limiting factor =  $\text{contribution per unit} \div \text{units of limiting factor used per unit}$

**Step 4** Rank the products in order of contribution per unit of limiting factor (highest first)

**Step 5** Make the products in order of their ranking until the limiting factor is used up (the optimal production solution)

#### Relevant costs

**Relevant costs** are avoidable cash flows. In other words they are:

- Future
- Incremental
- Cash flows

**Non-relevant costs** are unavoidable cash flows. They cannot be changed, no matter what is decided. They include:

- Sunk costs (past costs) – costs that have already been incurred
- Committed costs – costs for which there is already an agreement to incur the cost

The **opportunity cost** of a decision is the value of the next best alternative foregone.

Unless told otherwise in the exam assume that:

- Variable costs are relevant costs.
- Fixed costs are non-relevant.

The relevant cost of labour is:

- The variable costs of labour if labour is hired from outside the organisation
- The variable cost + opportunity cost (contribution lost by not doing the next best alternative) if labour is in short supply
- Nil if the labour is spare capacity that would be paid anyway.

The relevant cost of materials is:

- Replacement cost if the materials can be used for other production in the business,
- The higher of either the resale value or the value of using them for something else if materials have already been purchased and will not be replaced
- Nil if the materials have been purchased will not be replaced and have no resale value or alternative use

### **Make or buy decisions**

**Step 1** Calculate the incremental cost or saving of buying in = variable cost saved – external supplier's price

**Step 2** Calculate the resource shortfall in the limiting factor

**Step 3** Calculate the incremental cost of buying in per unit of limiting factor (e.g. per labour hour)

**Step 4** Rank according to cost per unit of limiting factor (cheapest first)

**Step 5** Determine the optimal make/buy solution

## Lesson 4: Introduction to capital investment appraisal techniques

### Simple interest

If interest paid or received is the same amount every year, this is **simple interest**.

$$\text{Simple interest} = P \times r \times n$$

where:

- P = principal (the amount invested originally)
- r = interest rate
- n = number of years

### Compound interest

With **compound interest**, the interest is calculated based on your principal plus the interest earned every year.

$$S = P \times (1 + r)^n$$

where:

- S = future value
- P = principal (the amount invested originally)
- r = interest rate (as a decimal)
- n = number of years of investment or borrowing

Interest can be compounded at different periods – for example, twice a year (semi-annually), every month or every day – rather than annually as above.

- The **nominal interest rate** is the stated interest rate without compounding rate (e.g. nominal rate of 1% per month means nominal rate for a year is 12%)
- The **effective interest rate** is the interest rate with compounding at the stated intervals. It is the rate of interest you will effectively receive in a certain period – for example, a year. Sometimes, this effective rate is called the **Annual Percentage Rate (APR)** or similar.

The formula for the effective interest rate is:

$$e = [(1 + r)^n - 1]$$

where:

- e = effective interest rate
- r = nominal interest rate
- n = number of times compounding occurs in the period

If the nominal rate is 3% per week, the effective rate if a loan is taken for seven weeks is  $[(1 + 0.03)^7 - 1] = 22.99\%$ .

## Compounding for investments

Compounding for investments is the same as compounding interest for bank deposits – the investment earns a return that builds up over time. The **future value of an investment** can be calculated using the following formula:

$$FV = PV \times (1 + r)^n$$

where:

- FV = future value, after n periods of time
- PV = present value
- r = rate of return per time period
- n = number of time periods (usually years)

## Discounting

if you have a choice between receiving \$500 now or \$500 in five years' time, you would be better off receiving the money now. This is because \$500 now will have the benefit of earning interest over the five years, whereas \$500 in five years' time will just be \$500!

This is known as the **time value of money**.

When we estimate the cash flows for an investment, the cash inflows could be several years in the future. We therefore need to discount the future value and convert it into a **present value** to find out what that future cash flow is worth to us today.

The formula for discounting is a rearrangement of the compounding formula above:

$$PV = FV \times \frac{1}{(1 + r)^n}$$

where:

- PV = present value
- FV = future value

You will be given the value for  $\frac{1}{(1+r)^n}$  in the exam if it is needed.

An **annuity** is a payment of the same value each period for an agreed number of periods.

- Present value of an annuity = annuity × annuity factor
- You will be given the annuity factor in the exam if it is needed.

A **perpetuity** is a regular payment of the same amount forever

- Present value of a perpetuity = annual payment / interest rate.

The PV of an amount that begins at the end of four years in the future, and will be received for six years = PV for nine years minus the PV for three years.

## Lesson 5: Discounted cash flow analysis

### Cash flow versus profit

When we do capital investment appraisals, we use cash flows rather than profit to assess the future value of the investment. There are four main reasons for this

- Cash flow is very important for organisations.
- We can take the **time value of money** into account
- Cash flow is a more objective figure than profit
- Cash flow is a better long-term indication of value.

### Net present value (NPV)

The **net present value (NPV)** method of **discounted cash flow (DCF)** analysis lets us know the surplus value in dollars we will get from an investment after netting off today's value of the future payments and receipts.

- If the NPV is positive then the investment is viable, or worthwhile. It will add value to the business.
- If the NPV is zero, then the investment will break even. It will be achieving the required return, so it is worth doing, but only just.
- If the NPV is negative, the investment is not viable – not worth doing. It will destroy value in the business if we proceed with it.
- If an organisation were choosing between two or more projects, it would accept the project with the highest NPV.

We only include relevant costs in our calculations.

We make some assumptions when we calculate NPV:

- All cash flows take place at the start or end of a year.
- The initial investment happens at Year 0 ('today').
- All the other cash flows take place at Year 1 or later.

To calculate the NPV:

**Step 1** Work out the relevant net cash flows for each year.

**Step 2** Apply the appropriate discount factors to the net cash flows to determine a PV of each net cash flow.

**Step 3** Total the PV to get an NPV.

The **cost of capital** is the rate of return that persuades an investor to give a company the money rather than invest elsewhere.

The target rate of return for an investment will be at least the company's cost of capital.

In the exam, if you are given the cost of capital, this is the target rate of return and it is the discount rate you should use for calculating the NPV.

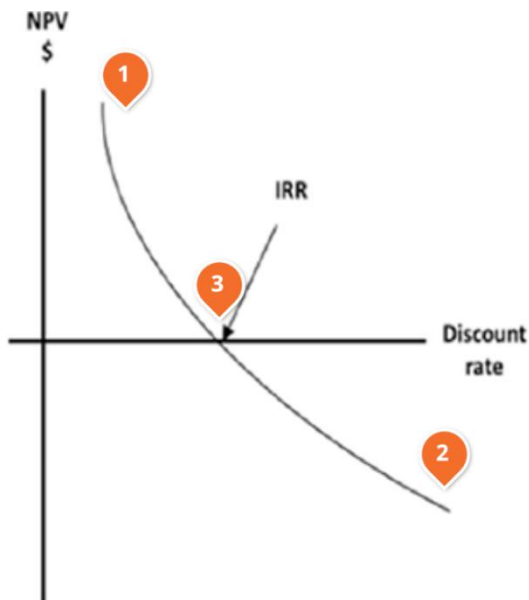
## Internal rate of return (IRR)

The **internal rate of return (IRR)** is the discount rate that gives you a NPV of \$0.

Organisations will often have a target rate of return for an investment to ensure that they cover their cost of capital:

- If the IRR is higher than the target rate of return or cost of capital, then the investment will be accepted, because it will add value to the business
- If the IRR is lower than the target rate of return or cost of capital, then it will be rejected, because it will destroy value in the business
- If an organisation is choosing between two or more projects, the project with the highest IRR will be accepted. (This is only true if all the potential projects have an IRR at least equal to the cost of capital).

Estimating the IRR using a graph:



- 1 The lower the discount rate, the higher the NPV.
- 2 As the discount rate goes up, the NPV drops.
- 3 NPV is \$0 where the line crosses the axis, so this is the IRR.

Estimating the IRR using the interpolation method:

**Step 1** Find an NPV at one discount rate.

**Step 2** Find an NPV at a higher discount rate if the NPV was positive at step 1, or at a lower discount rate if the NPV was negative at step 1



**Step 3** Use the formula:

$$IRR = ra + \frac{NPVa}{NPVa + NPVb}(rb - ra)$$

where:

- ra = lower discount rate (the one giving a positive NPV)
- rb = higher discount rate (the one giving a negative NPV)
- NPVa = NPV at rate a
- NPVb = NPV at rate b

Estimating the IRR using the extrapolation method:

Use the same formula as above but use two rates which both give positive NPVs or two rates which both give negative NPVs.

### Simple payback

Payback period is the time that it will take for the ongoing cash inflows of a project to equal the initial cash outflows. You can think of it as the break-even period for a project.

An organisation will usually set a limit on how long an investment project should take to break even or make a return. If the payback period for a project is within the limit set by the organisation, the project might be selected. If an organisation is considering two or more projects, it will likely select the project with the shortest payback period.

If the cash flows are the same each year:

Payback period = initial investment/cash inflow per period

If the cash flows are a different amount each year:

**Step 1** Calculate the cumulative net cash flow for each period.

**Step 2** Find the period in which the cumulative cash flow becomes positive.

**Step 3** Assume the cash flow is received in equal amounts during the period, and calculate when the cash flow will be nil (= cumulative net cash inflow in the previous period ÷ net cash flow in the period).

For example, if the cumulative net cash inflow in the previous period was \$(100,000) and the net cash flow in the period in which the cash flow becomes positive is \$300,000, the payback occurs  $100,000 \div 300,000 = 1/3$  of the way through the year i.e.  $1/3 \times 12 \text{ months} = 4 \text{ months}$ .

### Discounted payback

This takes the same approach as for the simple payback but uses discounted cash flows – so before step 1 above, discount the cash flows.

## MA2 Section 5

### Lesson 1: Cash and cash flow

#### Cash and cash equivalents

Cash includes:

- Cash in hand
- Current accounts at a bank
- Investments that you can quickly turn into cash and have a value that we can estimate reliably (**cash equivalents**)

#### Working capital

Working capital is cash that is tied up in trading assets.

Working capital = inventory + trade receivables – trade payables

- Payables is the amounts owed by a business that has made purchases on credit.
- Receivables is the amounts owed to a business that has sold materials on credit.

#### The working capital cycle

There is usually a delay between a company paying for raw materials and receiving cash from customers for finished goods. This is due to:

- The credit terms for suppliers and payables
- The time taken to produce goods
- The time taken to sell goods once they are finished

This is known as the **working capital cycle** – the time it takes for a business to turn its trading assets into cash. The diagram below shows an example of a working capital cycle:

The duration of the cycle depends on the nature of the industry (supermarkets versus manufacturing organisations) and the actions of competitors (the length of credit offered by other businesses).

#### Cash inflows and outflows

Cash inflow (receipts) is the money coming into the organisation, cash outflow (payments) is the money paid out by an organisation.

Receipts and payments can be organised as:

- Capital
- Revenue items
- Drawings

Alternatively, as:

- **Regular** items
- **Exceptional** items

## Cash flow patterns

Working capital cycles can be

- **Negative** – the business is receiving cash from customers before it needs to pay its trade suppliers (e.g. supermarket) – this is a good thing for organisations
- **Positive** – there is a gap between paying suppliers and receiving the cash from customers

## Cash accounting and accruals accounting

In cash flow accounting, items are recognised at the time of the payment or receipt.

In accruals accounting, we recognise items in the period of time in which the transaction took place, regardless of when the payment or receipt occurs.

For example: a company has a year-end of 31 December 20X1. It receives an electricity bill in January 20X2 relating to the period October to December 20X1.

- In cash flow accounting, we *pay the bill* in 20X2, so we include it in the 20X2 accounts
- In accruals accounting, we *used the electricity* in 20X1, so we include it in the 20X1 accounts.

Accruals accounting matches the costs with the benefits of incurring those costs (revenues). It gives a more realistic picture of performance. Cash accounting focuses on the cash requirements of the organisation, which will help it to avoid running out of cash to fulfil its obligations.

## Liquidity

'Liquid' refers to how close an asset is to being cash.

- Buildings are not liquid.
- Inventory is highly liquid
- Cash is perfectly liquid.

## Cash flow management

Cash flow management means making sure an organisation has the cash available to meet its obligations as they become due. Managers prepare cash flow forecasts to try to predict and avoid periods in which there might be a cash deficit.

- If the cash inflow is greater than the cash outflow, there is a **cash surplus**.
- If the cash inflow is less than the cash outflow, there is a **cash deficit**.

Cash management includes making decisions about how to use surplus funds and resolve cash deficits.

## Lesson 2: Cash management

### Treasury

Cash management is part of the wider task of **treasury management**.

### Economic and financial trends

Organisations will have different cash management priorities and strategies depending on what stage of the business cycle the economy is in.

Other **economic trends** include:

- Inflation
- Interest rates
- Foreign exchange rates
- Growth patterns in different industries
- Supply and demand of products.

### Cash management in the public sector

Private companies invest their own funds. They get that money from their shareholders and owners and are entrusted to use it to produce a return. Company funds can be used for speculative investments, which have a high level of risk.

Public sector funds come from taxpayers who give it to their government in order to pay for services like the police, healthcare, and defence. This money is held in trust in order to undertake specific tasks. Public sector funds *should not* be used for speculative investments where the principal (the money originally invested) could be lost.

## Lesson 3: Cash budgets 1

### Cash budgets

Running out of cash (and not being able to access more cash quickly enough) is a key reason why businesses fail. Cash budgeting minimises this risk.

Cash budgets help managers to:

- Identify cash deficits in advance
- Arrange to cover the deficits, either through effective cash management techniques or by making arrangements with a bank
- Use cash surpluses by investing the funds in short-term or long-term investments.

Cash budgets therefore help with cash management.

### Cash budgets versus operational budgets

Managers build cash budgets using operational budgets (for ordinary activities of the business) and capital budgets (for non-current asset purchases) as a starting point:

- Operational budgets are based on how much of the product the business can sell and make. Normally the restriction on operational activity is sales demand.
- Managers prepare a sales budget first, and the other operational budgets are generated from the sales budget.
- The cash budget then works out the cash consequences of the activities that have been planned in the operational budgets.

Cash budgets are different to operational budgets because the cash flows are recorded when cash receipts and payments actually occur. In operational and capital budgets, the timings could differ by several weeks, months or years. For example, the cost of purchasing a non-current asset might be shown over a period of years in the accounts through depreciation, but the actual cash outlay would occur in full at one time.

Assumptions made when preparing cash budgets should be stated so that:

- Someone reviewing the budget can either agree with them or challenge them in order to help produce a more robust budget.
- If any of the underlying factors change, you can identify the impact on the budget quickly and adjust it.

Many organisations prepare several versions of the cash budget based on different assumptions:

- **A target budget:** based on what the organisation wants to want to happen
- **An optimistic budget:** based on higher than expected sales
- **A pessimistic budget:** based on lower than expected sales

### Preparing a cash budget

**Step 1** Predict the anticipated cash receipts (sales (cash and credit), income from investments and sales of non-current assets).

**Step 2** Forecast the anticipated cash payments (consider credit periods allowed by suppliers, include wages and salaries, capital expenditure etc).

**Step 3** Calculate the net cash flow.

**Step 4** Calculate cumulative cash flow.

### Cash budgets and inflation

**Inflation** is the rate at which the general price level of goods and services in an economy increases over time.

The opposite of inflation is **deflation**, where prices fall.

An index, such as a consumer price index, can be used to measure the changes in the prices of goods and services.

Example:

20X1 – revenue \$10m, index 100 (so this is the base year)

20X2 – index 110, revenue =  $\$10\text{m} \times 110\% = \$11\text{m}$

20X3 – index 95, revenue =  $\$10\text{m} \times 95\% = \$9.5\text{m}$

### Time series analysis

We can identify four possible patterns in a time series:

- The **trend** (general direction of data line e.g. increasing sales over time)
- **Seasonal variation** (short-term fluctuations around the trend line, repeating over a predictable time frame e.g. restaurants are busier at the weekends than during the week – a weekly seasonal variation)
- **Cyclical variation** (variations around the trend line with a recurring cause, occurring over a longer period of time than seasonal variations e.g. business cycle of growth and recession)
- **Random variation** (unpredictable variations e.g. due to wars)

## Lesson 4: Cash budgets 2

### Seasonal variations: Additive model

Actual = trend + or – seasonal variation

**Step 1** Calculate the seasonal variation (actual – trend).

**Step 2** Tabulate and total the seasonal variations, and calculate an average.

**Step 3** Total the average seasonal variations and share this over the four quarters so that and the seasonal variations sum to zero.

**Step 4** Calculate the average trend movement per year.  
(Final moving average – first moving average) ÷ number of moving averages =

**Step 5** Predict future values.  
Actual = trend + or – seasonal variation

### Seasonal variations: multiplicative model

Actual = trend × seasonal variation

**Step 1** Calculate the seasonal variation (actual /trend)

**Step 2** Determine the average seasonal variation in the same way as above

**Step 3** Determine adjustment to seasonal variations

**Step 4** Predict figures  
Forecast = trend × seasonal variation

The multiplicative model will produce a more accurate prediction of future values than the additive model when the trend is increasing or decreasing over time. This is because the absolute value of seasonal variations are likely to be increasing or decreasing as well.

### Problems with predicting future values

We have assumed that there is a causal relationship creating a historical trend that will continue into the future. However, this may not be the case.

The further forward we try to predict the future, the less reliable the results will be.

### Monitoring and control

Cash budgets are prepared before the relevant time period. Cash flow forecasts are prepared in the time period. Because forecasts are prepared within the relevant time period, managers have more 'actual' figures in order to produce more accurate predictions

Managers need to regularly review cash budgets and forecasts and compare them with actual performance.

Why might a cash budget be different to actual cash flows?

- Invalid assumptions
- Unexpected events
- Unexpected inflation

If the forecasts indicate that there is a significant variance between budgeted and expected performance, managers may need to take corrective action to improve the organisation's performance.

- If the problem is lower than expected sales revenues, managers might ask the sales team to review their pricing and discount structure, increase marketing activities or take other measures to help improve sales.
- If the problem is that costs are increasing, costs should be reduced and controlled if possible.
- If options to control the cash flow in other ways are not possible, then the organisation may have to consider methods of financing.

There are a variety of short-term financing options available to organisations:

- Contingency funds – many organisations will keep some cash in a contingency fund in case of unexpected problems
- Overdraft facilities (borrowing on a bank current account)
- Short-term loans (provided by banks and building societies)
- Selling investments
- Postponing capital expenditure
- Reducing working capital cycles by leading and lagging, or reducing inventory levels



## Lesson 5: Investing and financing

### Cash surpluses

Cash management is concerned with optimising the amount of cash available to the company and maximising the interest on any spare funds not required immediately by the company.

A cash surplus might be used to:

- Pay dividends
- Invest and earn interest
- Maintain a contingency for unexpected problems
- Upgrade non-current assets
- Grow the business

**Short-term investments** are one way of using cash surpluses. They are usually lower risk than longer-term investments because it is easier to predict what will happen tomorrow than to predict what will happen in 10 years' time.

Short-term investments include:

- Bank deposits (immediate access, no risk)
- Money market financial instruments (higher return but more risk and/or no immediate access to funds)
  - Government stock/bonds
  - Local authority stocks
  - Certificates of deposit

### Managing cash deficits: raising finance

Organisations should always match the source of finance with how they will use the money:

- **Short-term finance** is for funding working capital – a short-term gap in cash flow
- **Medium-term finance** is for investment in medium-term projects or assets, such as launching a minor new product line or buying vehicles
- **Long-term finance** is for long-term projects such as buying a building or building a factory.

Types of finance or credit available include:

- Bank overdraft
- Revolving facility
- Term loan
- Banker's acceptance facility

Most business loans are **secured** (rather than **unsecured**). Non-current assets such as land, buildings and machinery are **fixed securities**. Inventory is known as a **floating security**.

The price of borrowing (interest) will vary according to who is borrowing the money and what the money is going to be used for. A lender will want a higher return for loans that are judged to have a higher level of risk.

Risk would be influenced by:

- The level of assets for security
- The level of debt
- Reputation of the borrower
- The reason for the loan